

Work Order ID: 59170

Thursday, May 27, 2010 12:35:49 PM



Page 1

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 5/27/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 6/11/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan: *A*Date: *10-5-27*

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D350-748-141

Rev E

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

5 10/6/13

110

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT _____

*DP**10-5-31*

120

0.00



QC15- Crosstube Dimensional Check

QC

Memo

0.00

Quality Control

GP 10.06.01

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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Required Date: 6/11/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Crosstubes	0.00							
	Crosstubes								
Crosstubes	Memo	0.00							
	1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs, Set-up drill table as per QSI 010								
	2-Deburr								
	3-Engrave Part # and Batch # as per Dwg D350-748-141								
	4-Remove all marks from tube within limits of D350-748-141								
	5- Apply a light coat of LPS3 on the interior of tube Batch: <u>M109956</u>								
140	QC5- Inspect part completeness to step on W/O	0.00							
	QC								
Quality Control	Memo	0.00							
	CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)								

MB 10-06-02
AWM 10-6-4
CL 10/6/4

100604

W/O:		WORK ORDER CHANGES						
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Customer:

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
Outsource3									
Outsource process - Cad plate	<p>Memo</p> <p>Issue P/O: <u>12026</u></p> <p>Stress relief at 375° for 5 hours</p> <p>Magnetic Particle Inspect per ASTM E1444</p> <p>Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2</p> <p>Embrittle relief at 375° for 8 hours, Chromate Treat</p> <p>Possibe Supplier: Southwest United Industries</p> <p>Ensure Certificate of Conformity is attached</p>	0.00							
160 	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging									
Packaging	<p>Memo</p> <p>Ensure certificate of conformity is attached</p>	0.00							
170 	QC5- Inspect part completeness to step on W/O	0.00							
QC									
Quality Control	<p>Memo</p>	0.00							

CY 10/6/4 ①

Pc/48/30 ①

ml 10 07 05 ①

W/O:		WORK ORDER CHANGES						
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Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

180



SprayPaint

Spray Painting

SprayPaint

Memo

1-Prime inside crosstube as per QSI 005 4.2
2-Prime Outside of Tube as per Dart QSI 005 4.2

0.00

0.00

m 10 07 05 ①

190



QC

Quality Control

QC14- Inspect Spray Paint

Memo

Then, Wrap in plastic bag to protect from scratches

0.00

0.00

RT 10-07-08

200



Crosstubes

Crosstubes

Crosstubes

Memo

1-Install Ground wire Insert, then insert screw and washer
2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035.
3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS

0.00

0.00

m 10 07 12 ①

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Reference:

Cust Item ID:

Customer:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8/10/12

Ⓢ

220

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10.7.12sf

230

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8/10/13

Ⓢ

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Customer:

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

240



Packaging

Packaging

0.00

Memo

0.00

Identify and pack for shipping as per PPP D350-748-101

Location: 163PPP Rev: 3

10-7-13

SP

250



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

mf
10-7-13

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Start Date: 5/27/2010

Required Date: 6/11/2010

Comments: IPP Rev:A New Issue 06-07-05 JLM
IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
IPP Rev:C Rev B 07-11-15 DD
IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

D350-748-141TRN

Manufactured No

110

Each

0.0000

1

1



Crosstube Turning Detail

ALS4-1032-225

Purchased No

200

Each

7,062.000

1

1



Insert

Location

Loc Qty

Loc Code

PK011

7062

110768

7062

AN960JD10

NAS1149D0363J Purchased No

200

Each

0.0000

1

1



Washer

D2856-400

Manufactured No

200

f

269.1088

1.181

1.243158



Abraison Strip

Location

Loc Qty

Loc Code

ST403

269.1088

50593

62.0568

56626

207.052

D3500-1

Manufactured No

~~200~~

Each

36.0000

4

4



Saddle

Location

Loc Qty

Loc Code

ST425

36

47119

1

52326

9

55605

26

B-55300 MA 10-05-31

W 10.07.12

M115107 10.7.12SP

W 10.07.12

10.7.12SP

Handwritten signature/initials

W/O:		WORK ORDER CHANGES					
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 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Date: 5/27/2010

Required Date: 6/11/2010

Start Qty: 1.00

Required Qty: 1.00

D3502-1 Manufactured No

200

Each

67.0000

2

2



Support

Location

Loc Qty

Loc Code

ST066

67

47120

1

50287

38

52903

28

MS21920-20

Purchased

No

200

Each

111.0000

2

2



Clamp (per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG

111

112307

2

112624

32

112793

3

114687

50

114779

24

MS27039-1-10

Purchased

No

200

Each

150.0000

1

1



Screw

Location

Loc Qty

Loc Code

ST291

150

112794

50

112940

100

W/ 10-07-12

W/ 10-07-12

W/ 10-07-12

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Shop Packet Print

Page 2

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IPP Rev:A New Issue 06-07-05 JLM

IPP Rev:B Update qty of MS21042L5 06-09-12 KJ

IPP Rev:C Rev B 07-11-15 DD

IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

AN4-41A

Purchased

No

220

Each

134.0000

8

8

Bolt

Location

Loc Qty

Loc Code

ST360

134

110731

2

111424

26

112082

6

113359

100

AN4-6A

Purchased

No

220

Each

926.0000

16

16

Bolt

Location

Loc Qty

Loc Code

ST356

926

112933

96

113149

600

114523

30

114615

200

AN5-32A

Purchased

No

220

Each

186.0000

4

4

Bolt

Location

Loc Qty

Loc Code

ST340

186

113121

36

114056

100

114405

50

AN960JD416

NAS1149D0463J

Purchased

No

220

Each

0.0000

32

32

Washer

Thursday, May 27, 2010 12:35:54 PM

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 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

AN960JD516

NAS1149D0563J Purchased

No

220

Each

0.0000

8

8

Washer

D3501-1

Manufactured

No

220

Each

479.0000

16

16

Bushing

Location

Loc Qty

Loc Code

ST066

479

45402

16

45918

159

48268

204

53779

100

MS21042L4

Purchased

No

220

Each

2,605.000

24

24

Nut

Location

Loc Qty

Loc Code

ST139

2

111827

2

ST300

2603

113422

80

114523

1515

114718

1000

9063

8

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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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IPP Rev:C Rev B 07-11-15 DD
IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Date: 5/27/2010

Required Date: 6/11/2010

Start Qty: 1.00

Required Qty: 1.00

MS21042L5

Purchased

No

220

Each

515.0000

4

4

Nut

Location

Loc Qty

Loc Code

ST300

515

113523

12

113537

3

114437

100

114449

400

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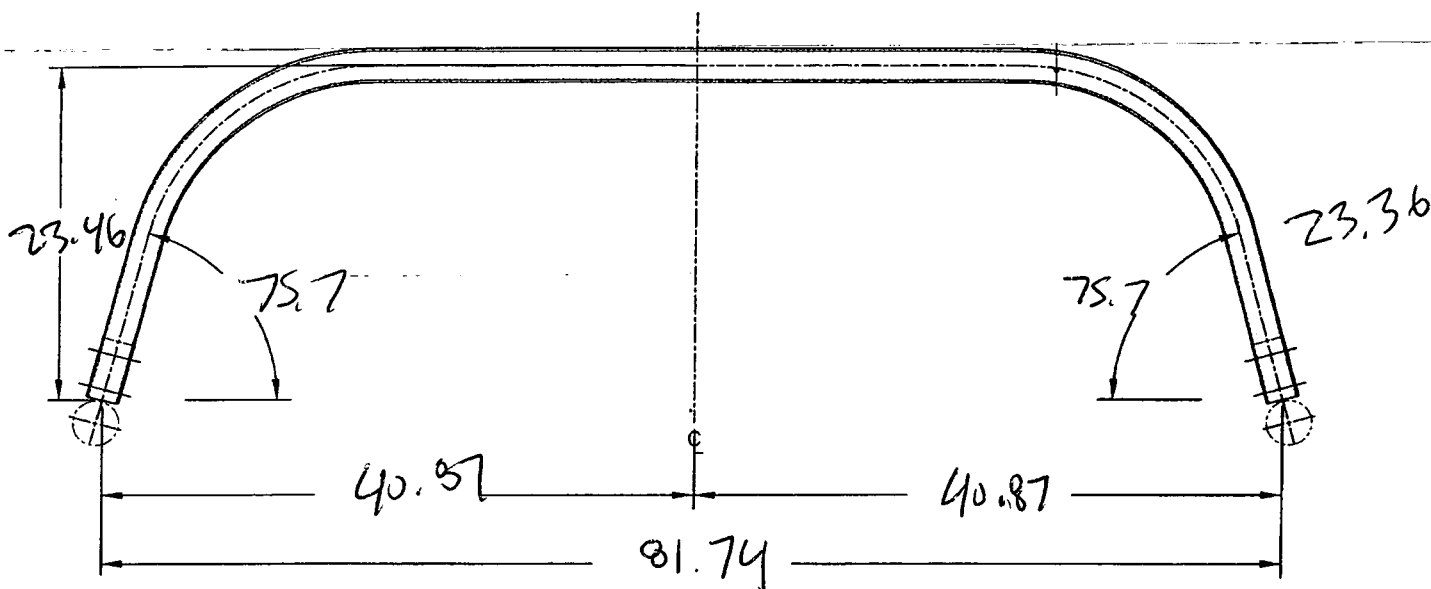
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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

DART AEROSPACE LTD		Work Order:	59170
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Twist = 0.268

QC15 Inspection	 10.06.01
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM 	

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Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

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WORK ORDER
NO. 59170
BJ 10-5-27

RELEASED
2009-10-29
JMB

E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 1 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

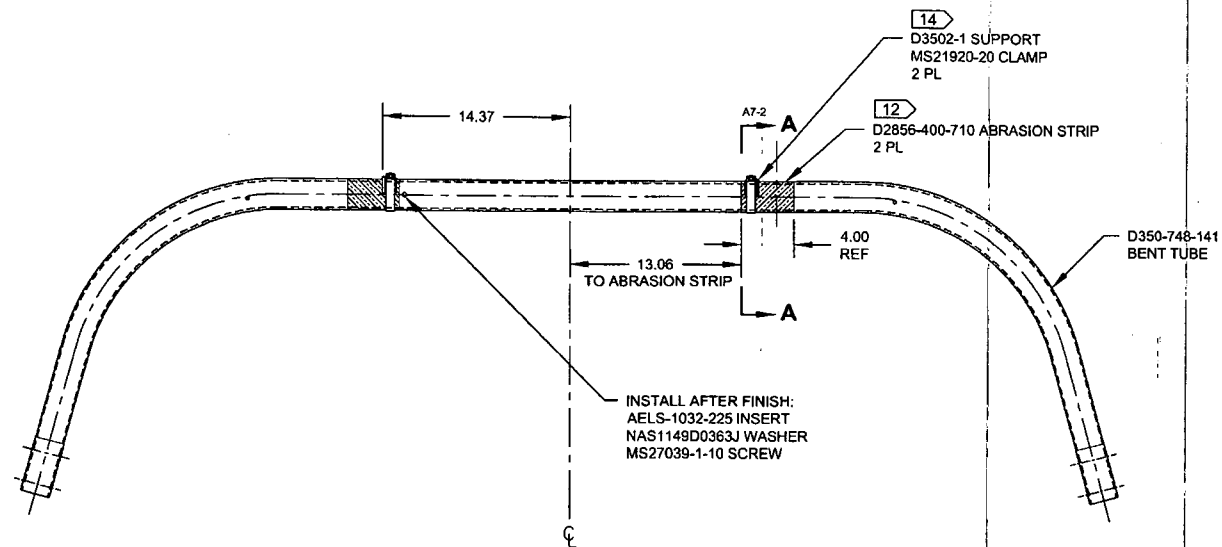
W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

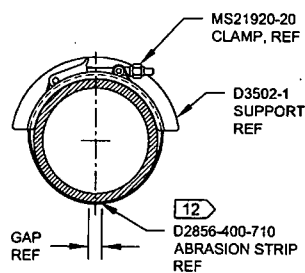
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

w/0 59170

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CHECKED	QP	DRAWING NO.	REV. E
MFG. APPR.	AS	D350-748-141	SHEET 2 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	AP	CROSSTUBE (AS 350/355 HI FWD)	NTS
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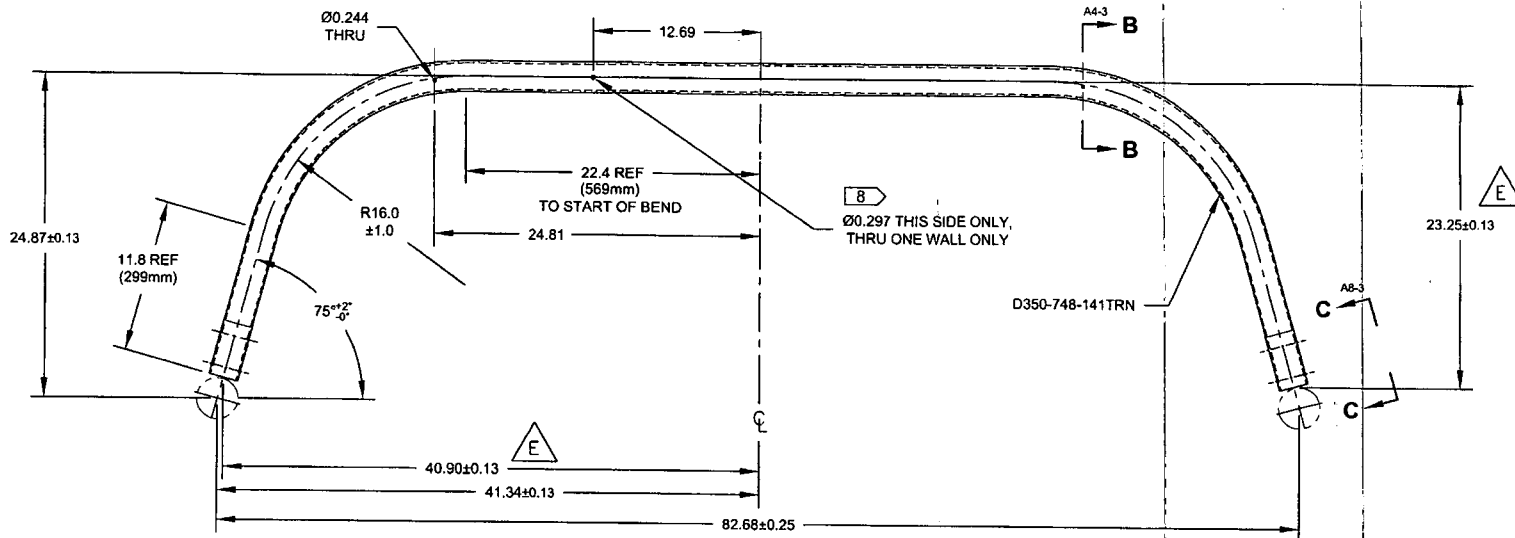
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

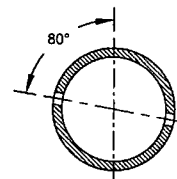
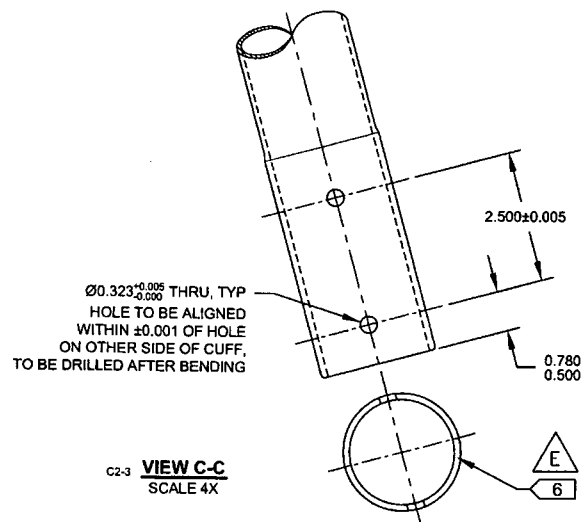
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
SCALE 4X

w/0 59170

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2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
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CHECKED	RF	DRAWING NO. D350-748-141	REV. E
MFG. APPR.	RF	TITLE	SHEET 3 OF 4
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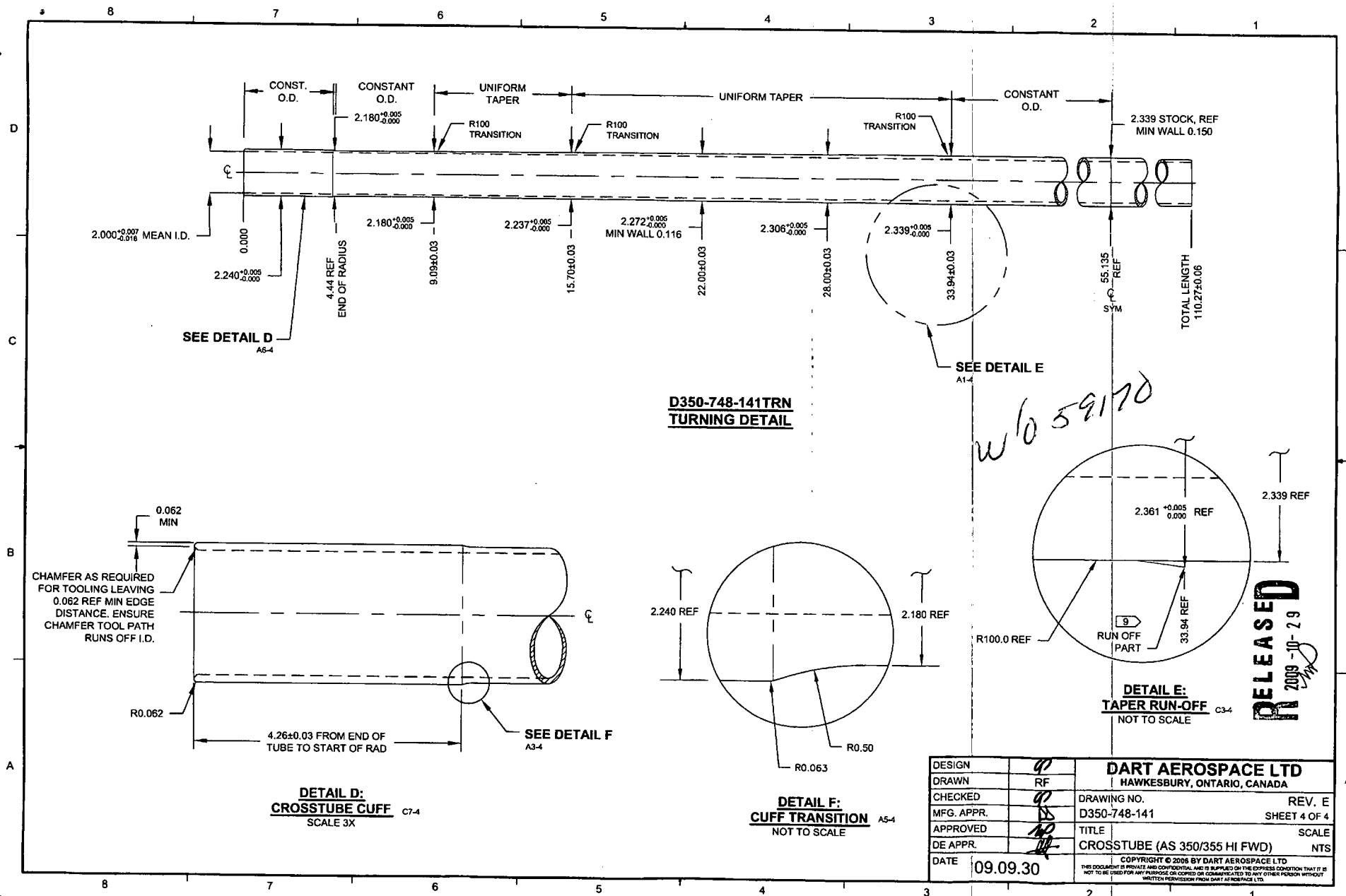
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



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MFG. APPR.	DS	D350-748-141	SHEET 4 OF 4
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jun-24-2010

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St
Hawksbury, ON K6A 1K7

W/O #: 96132

INVOICE #: 50108

**CONTRACT OR
PURCHASE ORDER #**

PO12026

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101

S/N # B59170

**CADMIUM PLATED IAW AMS-QQ-P-416B, TYPE 2 YELLOW, CLASS
1. BAKE HEAT CHART #10-634 & #10-649.**

[Handwritten signature] 10 07 05

CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.

Approved Inspector:



[Handwritten signature]

Work Order ID 59170

Thursday, May 27, 2010 12:35:49 PM

Page 1

Item ID: D350-748-101

Accept

Revision ID:

Item Name: Crosstube Installation, High Pwd

Start Date: 5/27/2010 Start Qty: 1.00

Required Date: 6/11/2010 Req'd Qty: 1.00

Reference:

Approvals: Process Plan:

QC:

Date: 10-5-27

Tooling:

Date:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D350-748-141

Rev E

100



DC

Document Control

DOCUMENT CONTROL

0.00

Memo

0.00

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

REFERENCE ONLY

C2 10/7/12

110



CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

0.00

Memo

0.00

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

DP

10-5-31

120



QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

Memo

0.00

GP 10.06.07